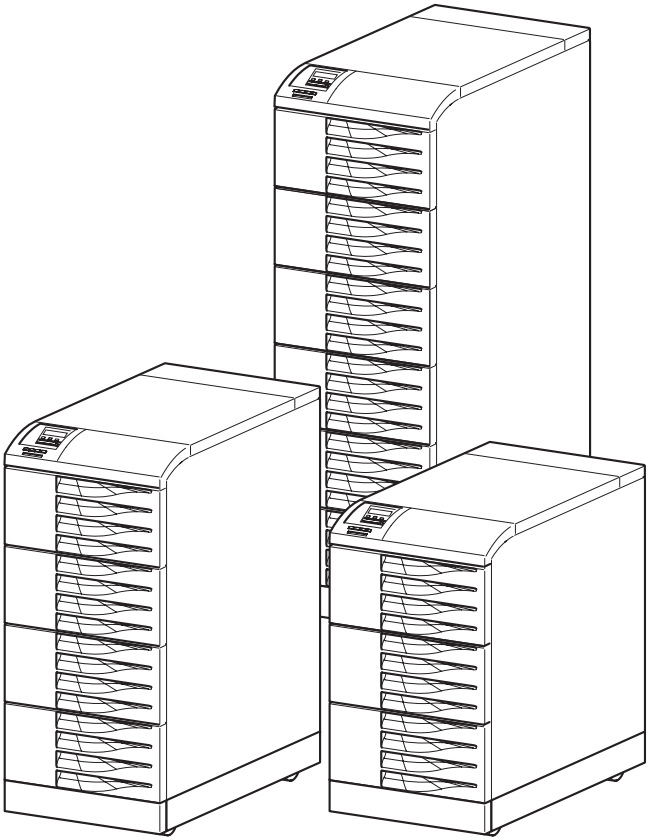
INSTALLATION AND OPERATING MANUAL

MASTERYS BC

from 8 to 12 kVA



socomec
Innovative Power Solutions UPS

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1 CERTIFICATE AND CONDITIONS OF WARRANTY

This SOCOMEC UPS continuous power system is guaranteed against any manufacturing and material defects.

The period of validity of the warranty is 12 (twelve) months from the date of activation, if said activation is carried out by SOCOMEC UPS personnel or personnel from a support centre authorised by SOCOMEC UPS, and not however more than 15 (fifteen) months from the date of shipment by SOCOMEC UPS.

The warranty is recognized within Italian territory. If the UPS is exported out of Italian territory, the warranty shall be limited to the cover of the parts used to repair the fault.

The warranty is valid ex-works and covers labour and parts used to repair the fault.

The warranty shall not apply in the following cases:

- Failures due to fortuitous circumstances or force majeure (lightning, floods, etc.);
- Failures due to negligence or improper use (use out of tolerance: temperature, humidity, ventilation, electric power supply, applied load, batteries);
- Insufficient or inadequate maintenance;
- Attempted maintenance, repairs or modifications not carried out by SOCOMEC UPS personnel or personnel from a support centre authorised by SOCOMEC UPS.
- If the battery has not been recharged in accordance with the terms indicated on the packaging and in the manual, in cases of extended storage or UPS inactivity.

SOCOMEC UPS may, at its own discretion, opt for the repair of the product or for the replacement of the faulty or defective parts with new parts or with used parts that are equivalent to new parts with regard to functions and performance.

Defective or faulty parts replaced free of charge are to be put at the disposal of SOCOMEC UPS who becomes the sole owner.

Replacements or repairs of parts and any modifications to the product during the warranty period cannot extend the duration of the warranty.

In no case will SOCOMEC UPS be responsible for damages (including, without limitations, damage for loss of earnings, interruption of activity, loss of information or other economic losses) deriving from the use of the product.

The present conditions are subject to Italian law. Any dispute falls under the province of the Court of Vicenza.

2.1 IMPORTANT.

- This document provides important instructions for the safe use, movement and connection of the MASTERYS™ uninterruptible power system (UPS).
- The unit must be installed and activated only by qualified technical personnel and authorised by SOCOMEC UPS.

The UPS MUST only be moved by two people at least.
The people MUST take position at the sides of the UPS with respect to the direction of movement.

- The unit must remain in a vertical position in all circumstances.
- Connect the PE ground conductor first before you make any other connection.
- Do not expose the UPS to rain or liquids in general. Do not introduce external bodies.
- If the UPS is not equipped with automatic sectioning against back feed or if the switch is external to the UPS, affix a label bearing the following words on all the external switches of the UPS power supply:

ISOLATE THE UPS BEFORE
OPERATING ON THIS CIRCUIT

- Keep this manual handy for future consultation.
- If the unit fails, it must be repaired only by authorised technicians that have been specially trained for this purpose.
- This equipment conforms to the European Community directives for professional equipment and bears the approval mark CE
- The equipment complies with Class A as per the EN50091-2 electromagnetic compatibility standards. In domestic environments it could cause radio interference, in which case additional measures may be necessary.
- L'UPS requires a three phase plus neutral input connection (3P+N) for 3/3 and 3/1 versions and a single phase plus neutral connection (1P+N) for 1/1 versions.
- Do not connect the output neutral to ground. The UPS does not modify the neutral arrangements of the system; the use of an isolation transformer is required should it be necessary to modify the neutral arrangements downstream of the UPS. The system must not be used without the input neutral connection.
- Switch off and isolate the UPS and then wait for 5 minutes before removing the protection panels in order to carry out work on parts under dangerous voltage.
- Danger of explosion if the batteries are replaced with others of the wrong type.
- Replaced batteries must be disposed of at authorised waste disposal centres.

It is very dangerous to touch any part of the batteries as there is no isolation between the batteries and the mains power source.

The product you have chosen is designed for commercial and industrial use only.
In order to be used for particular "critical applications" such as life support systems, medical applications, commercial transportation, nuclear facilities or any other application or systems where product failure is likely to cause substantial harms to person or property, the products may have to be adapted.
For such uses we would advise you to contact SOCOMEC UPS beforehand to confirm the ability of these products to meet the requested level of safety, performance, reliability and compliance with applicable laws, regulations and specifications.

2.2 DESCRIPTION OF THE SYMBOLS USED ON THE LABELS APPLIED TO THE UNIT.
Si ricorda di osservare tutte le avvertenze e le indicazioni riportate sulle etichette e targhette applicate all'interno e all'esterno dell'apparecchiatura.

DANGER! HIGH VOLTAGE (BLACK/YELLOW)

GROUND TERMINAL

READ THE USER MANUAL BEFORE USING THE UNIT

3 UNPACKING AND INSTALLATION OF THE UNIT

The packaging guarantees the stability of the UPS during shipping and physical transfer. Carry the packaged unit as close as possible to the installation site.

When moving the unit on even slightly sloping surfaces, use the blocking equipment and breaking devices to ensure that the unit does not fall over.

3.1 SHIPPING AND MOVING.

- The UPS must remain in a vertical position during all shipping and moving operations.
- The unit has wheels that can be used to move it for short distances.
- Ensure that the floor is strong enough to support the weight of the UPS and of the battery cabinet, if used.

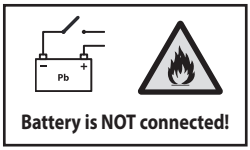
Avoid pressing on the front panels when moving the unit.

The UPS MUST only be moved by two people at least. The people MUST take position at the sides of the UPS with respect to the direction of movement.

CAUTION IF DAMAGED.

BATTERIES, NON SPILLABLE.

Packages, crushed, punctured, or torn such that contents are revealed **must** be set aside in an isolated area and inspected by a qualified person. If the package is deemed to be not shippable, the contents **must** be promptly collected, segregated, and either the consignor or consignee contacted.



All packaging material must be recycled in compliance with the laws in force in the country where the system is installed.

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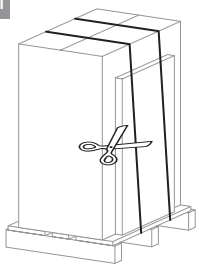
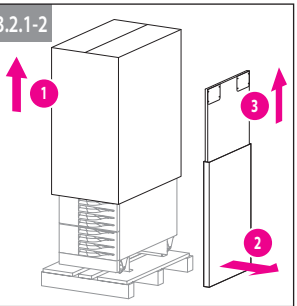
3.2 UNPACKING PROCEDURE.

3.2.1 Models "S" (h 800 mm) and models "M" (h 1.000 mm).

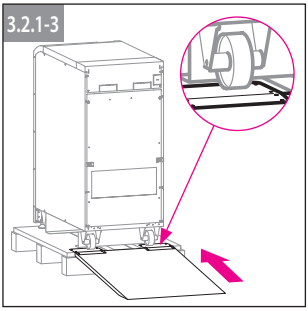
3.2.1-1



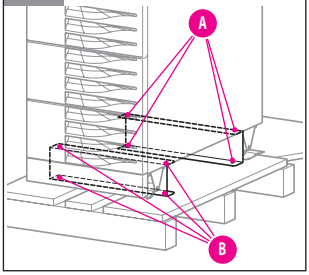
3.2.1-2



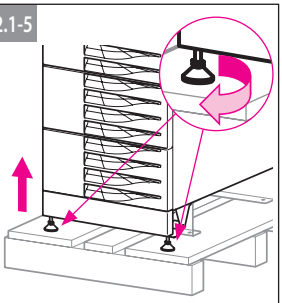
3.2.1-3



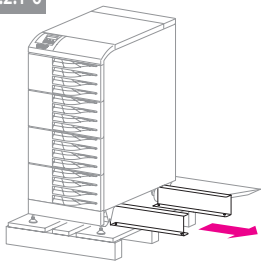
3.2.1-4 Remove screws **A** and screws **B**.



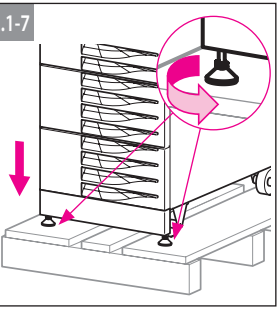
3.2.1-5



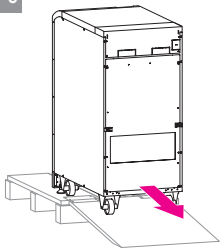
3.2.1-6



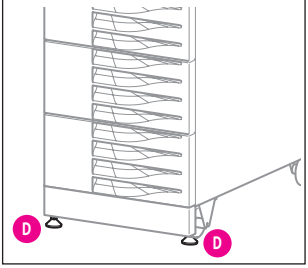
3.2.1-7



3.2.1-8



3.2.1-9 Secure the UPS with feet **D**.



Secure the UPS with feet D only when it is in position with cables connected.

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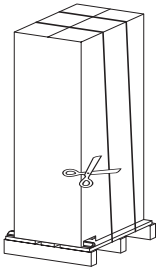
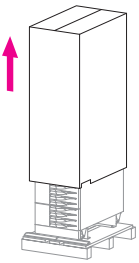
3.2.2 Models "T" (h 1.400 mm).

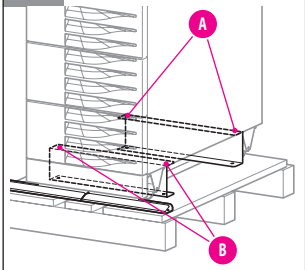
3.2.2-1



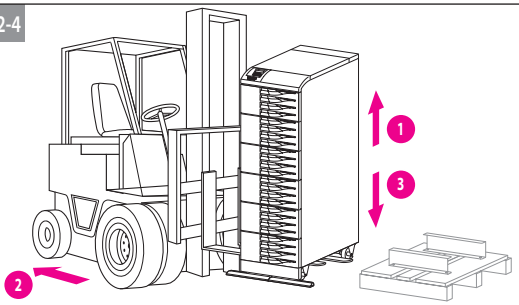
3.2.2-2



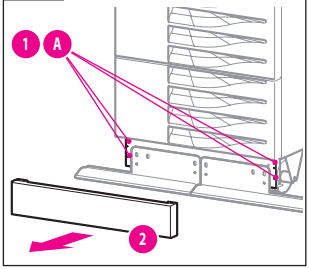
3.2.2-3 Remove screws **A** and screws **B**.



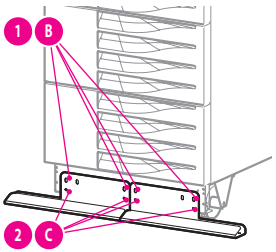
3.2.2-4



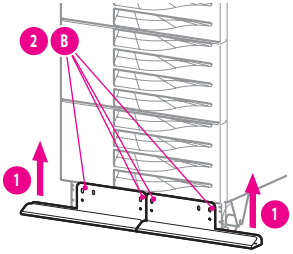
3.2.2-5 Remove screws **A**.



3.2.2-6 Loosen screws **B**.
Remove screws **C**.

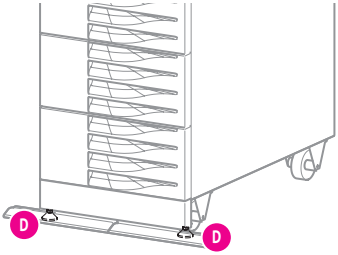


3.2.2-7 Tighten screws **B**.



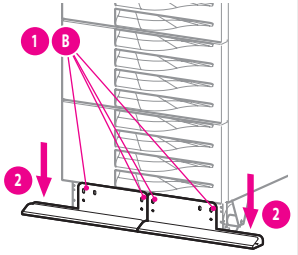
The UPS can be moved.
Place the UPS in the installation area.

3.2.2-8 Secure the UPS with feet **D**.



Secure the UPS with feet **D** only when it is in position with the cable connected.

3.2.2-9 Loosen screws **B**.



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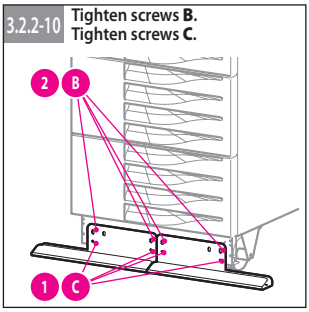
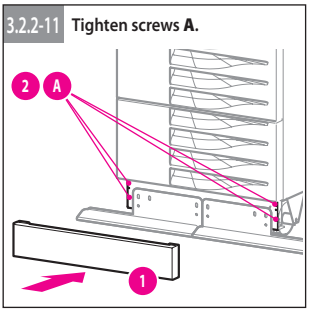
Innovative Power Solutions UPS





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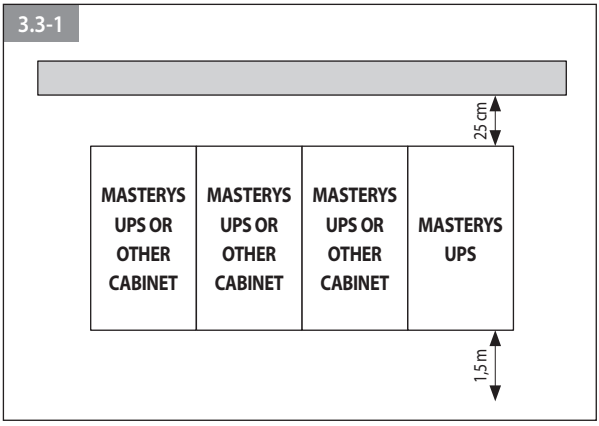
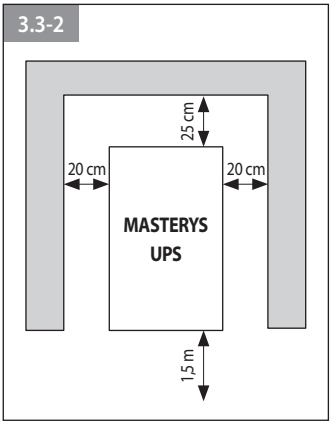
3.3 ENVIRONMENTAL REQUISITES.

- The recommended operating temperature, humidity and altitude values are listed in the technical specifications table (see chapter 11). Cooling systems may be required to maintain these values.
- Avoid dusty environments or areas where there is dust from conductive or corrosive materials (e.g. metal dust or chemical solutions).
- The UPS is not designed for outdoor use.
- Do not expose the UPS to direct sunlight or to sources of excessive heat.
- A space of at least 25 cm must be left at the back for adequate ventilation (see figure 3.3-1).
- The UPS switches are accessed from the front; however, a space of at least 1.5 metres should be left at the front of the UPS for maintenance purposes. It is also recommended to ensure that the cable connections are sufficiently long and flexible so that the unit can be extracted during maintenance (see figure 3.3-2).
- If it is not possible to leave sufficient space at the front, adequate access must be ensured from both sides.





3.4 ELECTRICAL REQUISITES.

The installation and the system must comply with national plant regulations. The electrical distribution panel must have a protection and sectioning system installed for the input mains and the auxiliary mains. If a differential switch is installed on the mains power switch (optional), it must be inserted upstream from the distribution panel.

The table below show the size of the input protection devices recommended for correct installation.

Size of the input protection devices

UPS (kVA)	Magneto-thermal input[1] (A) single/parallel[2]	Magneto-thermal Aux Mains[1] (A) single/parallel[2]	Magneto-thermal Common input mains[1] (A) single/parallel[2]	Differential input (A) selective type[3]	IN - OUT terminal
8 1/1	40	50	63	0,1	CBD16 (25 mm²)
8 3/1	16	50	63	0,1	CBD16 (25 mm²)
10 1/1	50	63	63	0,1	CBD16 (25 mm²)
10 3/1	20	63	63	0,1	CBD16 (25 mm²)
10 3/3	20	20	25	0,1	CBD16 (25 mm²)
12 3/1	20	63	63	0,1	CBD16 (25 mm²)
12 3/3	20	25	25	0,1	CBD16 (25 mm²)

[1] Curve magneto-thermal switch recommended, four or two poles depend of the applied mains.

[2] On systems with two UPS operating in redundant or power parallel.

[3] Caution! Use selective type differentials. Any current dispersed by the loads will be summed to that of the UPS. The differential protection must be regulated in cases of loads with high current dispersion.

Protection of the loads is advisable to ensure selectivity when the UPS runs off the batteries.

UPS (kVA)	Magneto-thermal curva C (A)	Fuse UR (A)
8 1/1	≤6	≤16
8 3/1	≤6	≤16
10 1/1	≤6	≤16
10 3/1	≤6	≤16
10 3/3	≤4	≤10
12 3/1	≤6	≤16
12 3/3	≤4	≤10

This unit has been designed for connection to an ordinary AC power supply, i.e. with transient voltage in overvoltage II category.
Should it be necessary to connect the UPS to a higher overvoltage category (e.g. at the beginning of the installation, or to primary distribution circuits), or should the UPS risk being exposed to higher transient overvoltages, adequate external protections must be installed.

In the event of three-phase distorting loads connected in output, the current on the neutral conductor may have a value that is 1.5 - 2 times the phase value (also for the input bypass). In this case, size the neutral cables adequately.

3.4.1 Back-feed protection.

If the UPS does not have an automatic protection device against current back-feed, the operator/installer must add a warning label to all the mains power disconnecting switches installed at a distance from the UPS area, so as to remind technicians of the fact that the circuit is connected to a UPS (see the CAUTION section in paragraph 2 of this manual and paragraph 4.5.3. of the EN62040-1-1 2003-11 standard.
The label is supplied with the system.
The back-feed protection device may be built into the system (only on specific request), or may be installed externally as the UPS has a command for an external remote switch that can be inserted upstream of the UPS:

- If the UPS does have an automatic back-feed switch (only on request), proceed with the connection to the mains and to the auxiliary power supply unit (if these are separate), as described in paragraph 3.5 of this manual.
- To install an external back-feed protection device, use the optional card (BKF) to be installed on the terminal board panel, and an external remote switch that should be installed **as close as possible to the UPS area**. For further information on the connection and the type of remote switch, please read paragraph 10.6 of this manual.

ATTENTION.
The neutral is not disconnected as, even in the event of a single fault on the UPS, it never has high potential when the mains and/or auxiliary power supplies are disconnected upstream. This is to prevent transformation of the power source to the UPS every time there is a power failure.
Should the neutral potential be very high due to certain error conditions or due to installations downstream (e.g. ground fault not detected and protected, high dispersion of a phase, or the IT system), it will be necessary to install either devices that disconnect the Neutral or alternatively a system that detects, signals and protects against high neutral/ground potential that could lead to UPS failure.

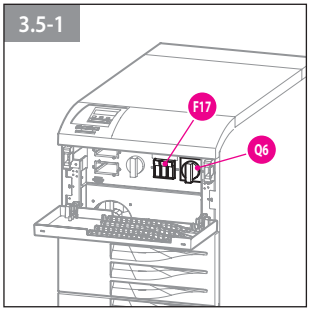
3.5 INSTALLATION PROCEDURE AND INSTRUCTIONS.

The procedure below should be strictly followed for correct installation:

3.5-1 a) Make sure that switch **Q6** is in position 0 and that the battery switch **F17** is open.

Make sure that the UPS is switched off, disconnect it from the mains, isolate the system and wait for 5 minutes before touching the terminal board or any parts inside the UPS.

3.5-1



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3.5-2 Open the terminal board protection panel at the back of the UPS by removing the four fastening screws **A**.

The UPS can never be used without the neutral input connection.

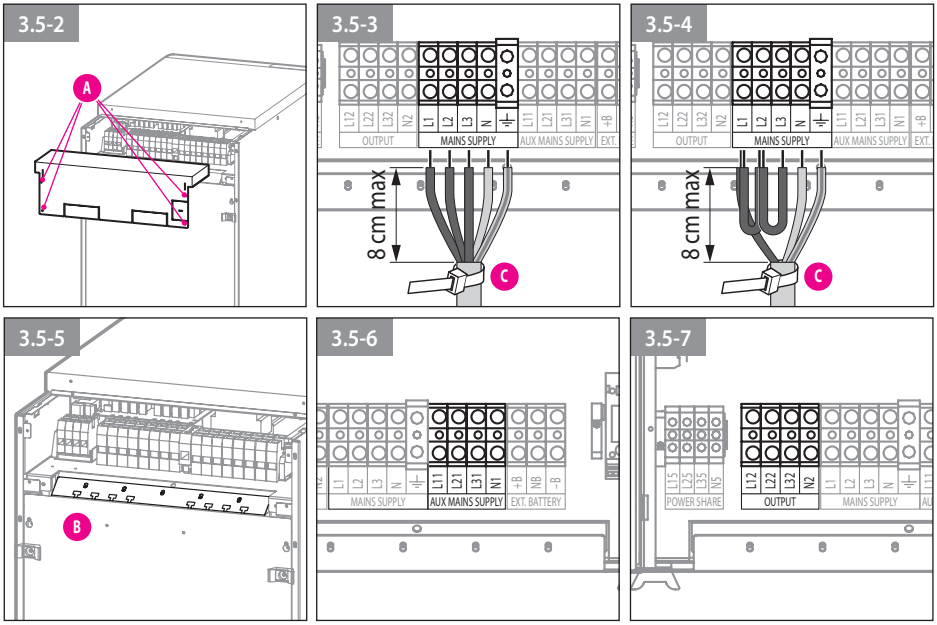
3.5-3 Connect the ground lead to the terminal with the corresponding symbol. Connect the input leads to the terminals marked "MAINS SUPPLY" **L1**, **L2**, **L3**, **N** (respecting the cyclic direction). The system is supplied from the factory configured with three-phase input. To use it with single-phase power supply (only 8 and 10kVA with single-phase output); connect the lead to the three terminals **L1**, **L2**, **L3** that have been jumpered together (figura **3.5-4).**

The terminal board is the most complete version including all options; in the basic models or in the versions with internal batteries the terminal board has fewer terminals. Refer to the names of each terminal to identify it during connection. After connection secure the cables with bands C (figure 3.5-3 e 3.5-4) to couplings B as shown in figure 3.5-5.

3.5-6 Connect the cables of the separate auxiliary power supply (if present) to the terminals labelled "AUX MAINS SUPPLY" **L11, L21, L31, N1** (observing the phase cycle direction).

If the UPS has the internal manual bypass option, in order to perform maintenance operations it must be possible to disconnect the mains and the auxiliary power supply separately. See paragraph 4.5.

3.5-7 Connect the output cables to the terminals labelled "OUTPUT" **L12**, **L22**, **L32**, **N2**.



3.5-8 Connect the Power Share cables, to the terminals labelled "POWER SHARE" **L15**, **L25**, **L35**, **N5** (if the option is available).

3.5-9 Divert any control cables from the front (RS232, signalling relay contacts, etc.) into the appropriate side cable run **A**.

3.5-10 Remove the pre-cut detail **C** and bend details **B** to pass the cables. Once the cabling has been completed, secure the terminal board cover with the four screws. Use of special toothed contact washers is recommended as they ensure that the panel is grounded.

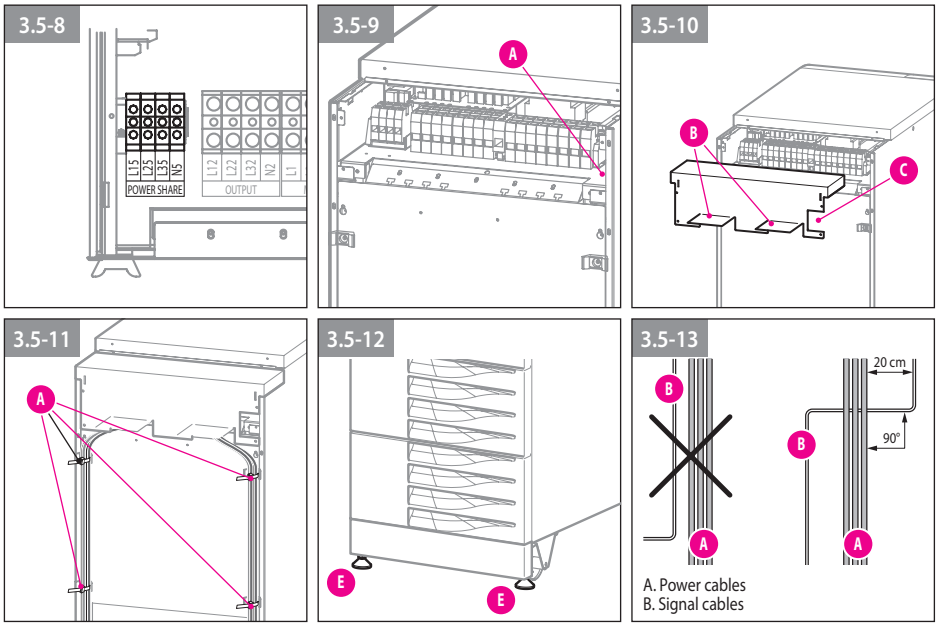
Secure the cables to the couplings D located on the rack as shown in Fig. 3.5-11, ensuring that the air vents are not obstructed in any way.

Once the cabling has been carried out, secure the UPS with the fixing feet E as shown in Fig. 3.5-12.

3.5-13 NOTE.

If the system is installed on a raised floor (such as in a data processing room):

- leave a space of at least 20 cm between the power and the control cables;
- avoid parallel channelling over long distances, with cables crossing at 90° instead.



ENGLISH

3.6 CONNECTION OF THE GENERATOR.

If your system uses a generator, connect the "generator set ready" no-potential contact to connector **IN 2** on the optional ADC card configured in standard or power safe mode (see paragraph 10.1). This automatically extends the voltage and frequency value range when power is supplied by the generator set.

3.7 EXTERNAL E.S.D. CONNECTION.

A remote emergency shutdown system (E.S.D.) can be installed by means of the optional ADC card; see paragraph 10.1. Connect a normally closed zero-potential contact to terminals **IN1+** and **IN1-** of the ADC card.

3.8 CONNECTING THE UPS TO AN INTERNAL ISOLATION TRANSFORMER.

UPS systems with internal isolation transformers come in T-shaped cabinets that are 1.400 mm high. Refer to the following instructions for installation and connection:

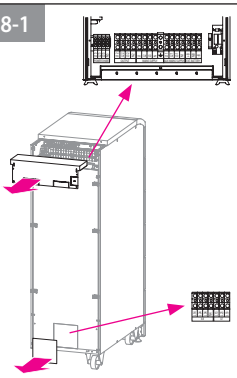
- refer to chapters 2 and 3 of this manual for indications on moving and installing the cabinet;
- see paragraph 3.4 for details about protections;
- the protection cable marked with the ground symbol is connected directly to the distribution panel;
- the transformer can either be connected to the UPS input or output.

The UPS must not operate without the neutral connection in input.

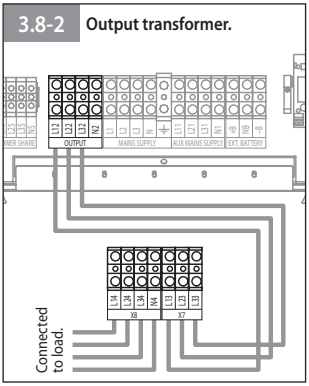
- for details of the connections, refer to the transformer terminal board diagram;
- depending on the UPS version chosen, three-phase or single-phase terminals will be available. **Do not use terminals L2, L3, L21, L31, L22, L32, L23, L33, L24, L34, L25 and L35 on single-phase UPS systems.**

UPS systems with a built-in isolation transformer are connected to the output in the standard configuration mode. (Fig. 3.8-2). The figures below show the connections required if the transformer must be connected to the mains power input (Fig. 3.8-3) or to the auxiliary power supply input (Fig. 3.8-4).

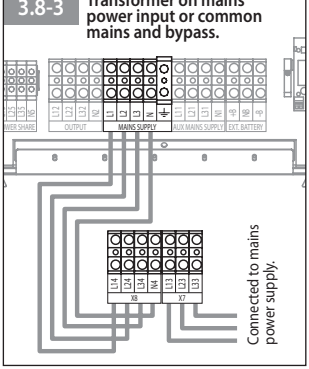
3.8-1



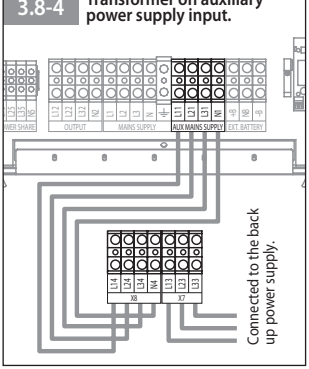
3.8-2 Output transformer.



3.8-3 Transformer on mains power input or common mains and bypass.



3.8-4 Transformer on auxiliary power supply input.



3.9 UPS PARALLEL CONFIGURATION.

3.9.1 General.

Parallel connection enhances UPS reliability, performance and power.
All MASTERYS™ models can be installed in parallel configuration provided they have the special parallel kit that can be installed in factory or later by specialist personnel.
The UPS units connected in parallel configuration are identical to a standard UPS, as a result safety, shipping and installation recommendations in chapters 2 and 3 also apply.

3.9.2 Installation.

UPS units operating in parallel (max. 2) are interconnected using control cables **B** (fig. 3.9.4-1). A maximum distance of approx. 3 metres between the UPS modules is possible using these cables.

3.9.3 Power cable connections.

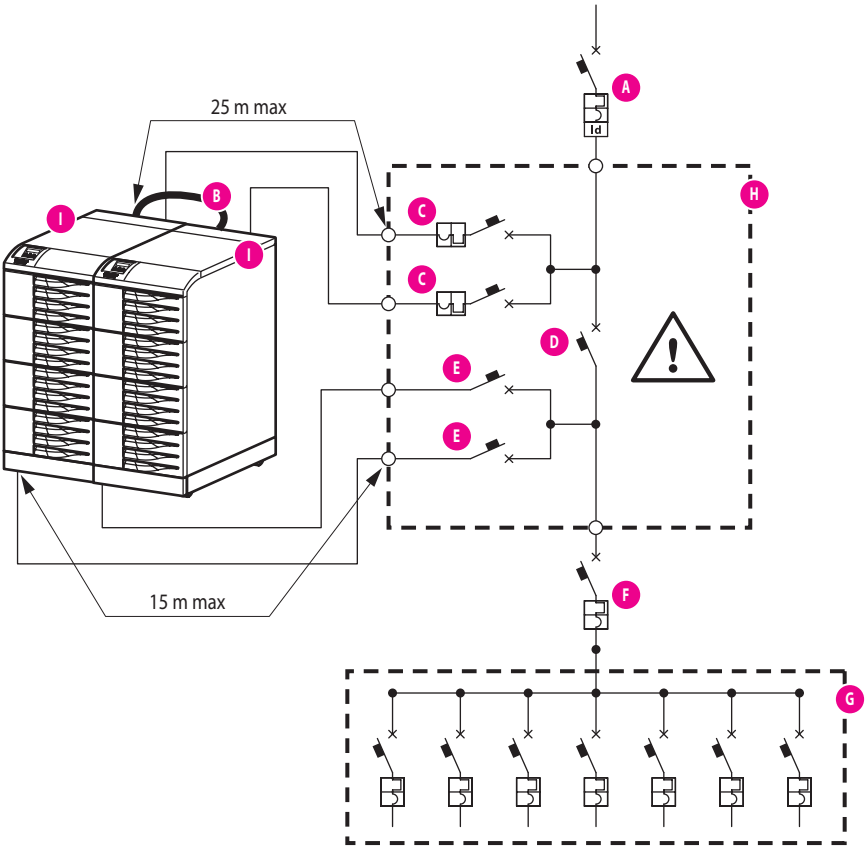
- The power supply to each unit must be protected as indicated in the table in paragraph 3.4.
- The cross section and length of the input and output cables must be identical for the two units.
- The phase rotation must be the same for each unit connected in parallel and also on any external manual bypass line.
- Cables of the same length must be used for the distribution connection between the general power switch **A**, the switches **C** and the respective UPS units. The length of the cables from **A** to each UPS must not exceed 25 meters (Fig. 3.9.4-1).
- The cables from the UPS to circuit breaker **F** must be of the same length (max. 15 metres).
- If a differential switch is installed on the mains power switch (optional), it must be inserted upstream from the distribution panel (see fig. 3.9.4-1, detail **A**), it must be a selective type and the trigger value **must be 0.1 A by the number of UPS connected in parallel**.
- The automatic switch **A** must have a D intervention curve and a current value double that shown in the Magneto-thermal on Auxiliary Mains column in table 3.4.

3.9.4 Control connections.

In order for units connected in a parallel configuration to operate correctly, control cables are required to exchange data between the various UPS units making up the parallel system for management of correct load sharing and synchronisation logic.
The cables in question are supplied with the UPS in case of standard parallel setting or are attached to the parallel kit in case of later upgrading of the system.
Parallel configuration must only be activated by SOCOMEC UPS qualified personnel.

ENGLISH

3.9.4-1 RECOMMENDED PARALLEL CONFIGURATION.



A Main differential magneto-thermal switch.
B "Parallel bus" cable.
C Single UPS magneto-thermal switch (if a separate auxiliary power source is used, add a magneto-thermal switch for each UPS).
D External bypass magneto-thermal switch.
E Output switch.
F System shutdown switch .
G Distribution.
H Parallel distribution panel (Optional).*
I UPS.

* The optional parallel distribution panel (H) has special filters to optimise UPS parallel operation.

Only activate circuit breaker D after carrying out the procedure describing the paragraph 7.1.4 "switching onto the manual bypass".

4.1 ON LINE OPERATIONS.

A special feature of the MASTERYS™ series is the "ON LINE" double conversion feature in conjunction with low distortion mains power absorption. With ON LINE mode, the UPS is able to supply a voltage that is fully stabilised in frequency and amplitude, regardless of any interference in the mains power supply within the most stringent classification of UPS regulations.

ON LINE operation provides three operating modes according to mains and load conditions:

- **"Normale" mode**.

  This is the most frequent operating condition: the energy is drawn from the primary mains power supply and is converted and used by the inverter to generate the output voltage to power the loads connected.

  The inverter is constantly synchronised in frequency with the auxiliary mains to enable load transfer (due to an overload or inverter shutdown) without any break in the power supply to the load.

  The battery charger supplies the energy required to maintain or recharge the battery.

- **"Bypass" mode**.

In case of inverter failure, the load is automatically transferred onto the auxiliary mains without any interruption in the power supply. This procedure may occur in the following situations:

- in the event of a temporary overload, the inverter continues to power the load. If the condition persists, the UPS output is switched onto the auxiliary mains via the automatic bypass. Normal operation, which is from inverter, returns automatically a few seconds after the overload disappears.
- when the voltage generated by the inverter goes is out of tolerances due to a major overload or a fault on the inverter.
- wWhen the internal temperature exceeds the maximum value allowed.

- **"Battery" mode**.

  In the event of a mains failure (micro interruptions or extended black-outs), the UPS continues to power the load using the energy stored in the battery. The Expert Battery System keeps the user constantly informed on the battery status and on the back-up time available. The disconnection of non mission critical applications during battery discharge can be programmed (after a certain laps of time) by using the Power Share option, so that the battery resources can be reserved for the most critical applications.

4.2 OPERATION IN HIGH EFFICIENCY MODE .

The UPS has a selectable and programmable "economy" operating mode that can increase overall efficiency by up to 98% for energy saving purposes. With this mode of operation, specific daily or weekly time intervals can be selected and programmed to power the applications directly from the auxiliary mains. If the power supply outage, the UPS will automatically switch onto the inverter and continue to supply power to the load by drawing energy from the battery.

This mode does not provide perfect stability in frequency and voltage like the ON LINE mode. Thus the use of this mode should be carefully evaluated according to the level of protection required by the application.

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4.3 OPERATION WITH EXTERNAL MANUAL BYPASS (optional).

The external manual bypass may be placed on the general distribution panel when the UPS is installed, or by installing the bypass panel that is supplied on request.

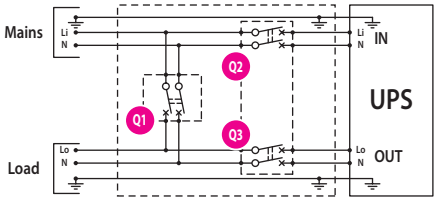
If the UPS has an input for the auxiliary power supply, the **Q2 disconnecting switch must be connected** to this input and the main power supply input must be disconnected on the control panel.

If the manual bypass is activated, the load is powered directly by the back up power supply, while the UPS is practically excluded and may be switched off.

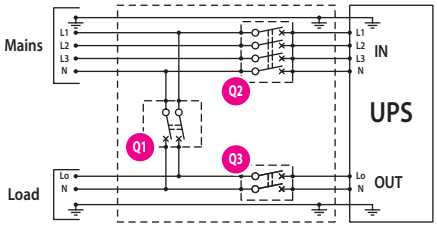
This operating mode can be useful during maintenance operations on the UPS, as it ensures safe intervention of technicians while ensuring no break in the power supplied to the load.

Bypass panel connection diagram.

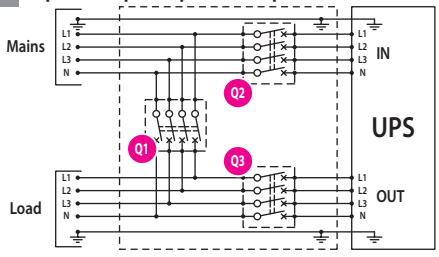
4.3-1 1-phase input 1-phase output for UPS 1/1.



4.3-2 3-phase input 1-phase output for UPS 3/1.



4.3-3 3-phase input 3-phase output for UPS 1/1.



Q1 Bypass disconnecting switch
Q2 Mains power disconnecting switch
Q3 Output disconnecting switch

4.4 OPERATION WITH INTERNAL MANUAL BYPASS (option).

This operating mode can be useful during maintenance operations on the UPS, as it ensures safe intervention of technicians while ensuring no break in the power supplied to the load.

If the manual bypass is activated, the load is powered directly by the back up power supply, while the UPS is practically excluded and may be switched off.

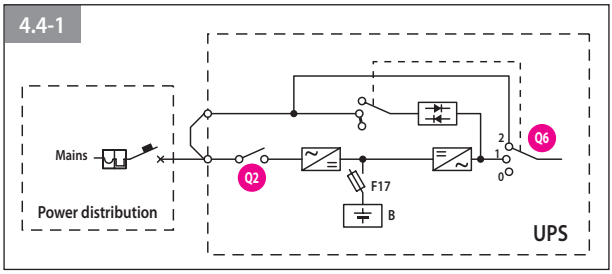
The internal manual bypass accessible on the control panel **Q6** includes all three disconnecting switches (**Q1**, **Q2** and **Q3**) indicated in figure 4.3-1, 4.3-2 and 4.3-3 in a single switch and opens the auxiliary mains supply inside the UPS at position 0 and 2. See the block diagram of the internal manual bypass.

In cases of internal manual bypass the **Q6** switch has three positions:

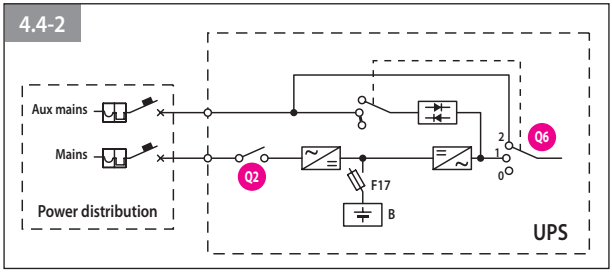
0	OFF	Disconnects the UPS output (internal E.S.D.)
1	Output on UPS	Connects the load to the UPS
2	Manual bypass	Depending on the plant type, connect the load either to the MAINS (figure 4.4-1) or to the AUX MAINS (figure 4.4-2).

Block diagram of the internal manual bypass.

4.4-1



4.4-2



4.5 OPERATION IN GE CONFIGURATION.

MASTERYS™ can be operated in conjunction with a generator (GE).

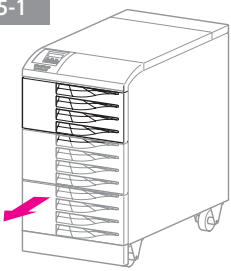
With a generator, the frequency and voltage ranges of the auxiliary mains can be increased to accept the instability of the GE and at the same time to avoid operation from the battery or risks of out-of-synchronisation when switching onto the bypass.

ENGLISH

This chapter identifies the electromechanical switches, described below, and used for start-up, shutdown and maintenance bypass procedures.

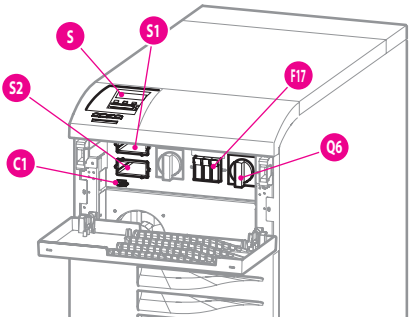
Access to the control area is from the front by opening the upper door using the red handle as shown in figure 5-1. The control area also contains the communication interface connectors and the slots for the optional signalling cards. Please refer to the relevant chapter for more details on the connection and use of the related communication interfaces/cards.

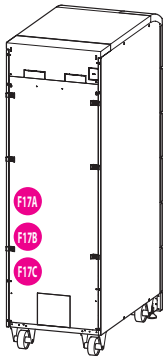
5-1



5.1 IDENTIFYING THE SWITCHES AND INTERFACES.

5.1-1

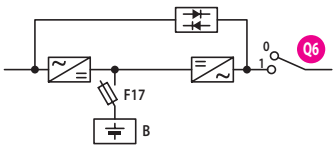




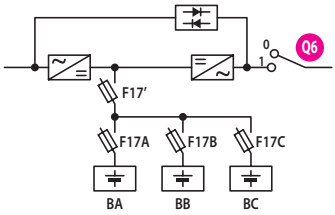
Legend.

B	Internal batteries for standard back up	**F17A**	Battery A disconnecting switch on rear of UPS (32A UR)
BA	Internal battery A	**F17B**	Battery B disconnecting switch on rear of UPS (32A UR)
BB	Internal battery B	**F17C**	Battery C disconnecting switch on rear of UPS (32A UR)
BC	Internal battery C	**Q6**	Output shutdown switch (E.S.D.)
C1	Serial connector RS232/485	**S**	Mimic panel
F17	Battery switch (32 A UR)	**S1**	Options slot 1
F17'	Battery main disconnecting switch (30 A Gg)	**S2**	Options slot 2

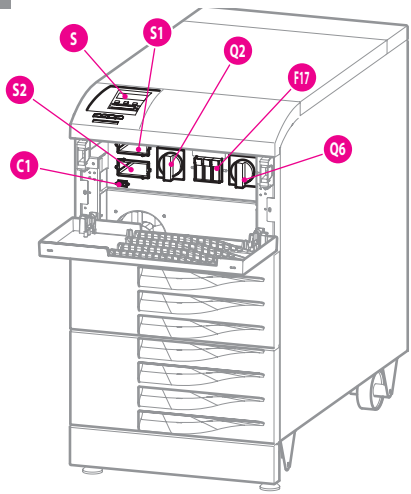
With standard backup.



With battery expansion.



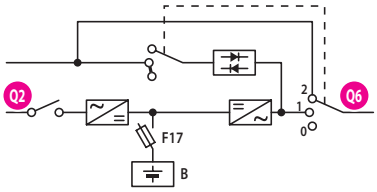
5.1-2



Legenda.

B	Internal batteries for standard back up
C1	Serial connector RS232/485
F17	Battery switch (32 A UR)
S	Mimic panel
S1	Options slot 1
S2	Options slot 2
Q2	Input mains switch (only with the internal bypass option)
Q6	Output shutdown switch (E.S.D.)

With internal manual bypass.



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5.2 FUNCTIONS OF THE SWITCHES.

Output switch Q6.

Switch Q6 has two positions, with the following functions:

- **Position 1 "UPS"**: This is normal UPS operating mode that ensures continuous power supply to the load
- **Positin 0 "OFF"**: Fully disconnects the UPS output, interrupting power to the loads in any operating mode (unless the external manual bypass is active). It is used to shutdown the load in emergency situations (internal E.S.D).

Batteries switch F17.

If this switch is closed it connects the internal batteries to the DC/DC converter output to power the inverter during a power failure. The normal operating position of the switch is closed.

The disconnecting switches F17A, F17B and F17C are included on all UPS systems with more than one battery set and allow the separate disconnection of the various banks. The normal operating position of the switch is closed.

ENGLISH

6.1 BASIC MIMIC PANEL.

The LCD mimic panel (figure 6.1-1) located on the upper part of the UPS provides all the information on operating status, electrical measurements, access to controls and configuration parameters.

The information is grouped into four sections:

A. LEDs that identify the subsets and the energy flow;

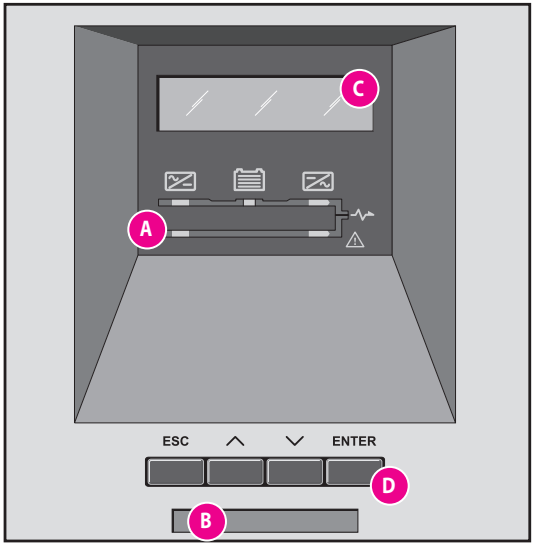
B. Multicoloured light bar that identifies the condition of the power supply to the load;

C. Alphanumeric information that uses a menu layout to provide details on any alarms that may occur and on the measurements, controls and parameters.

D. Use of the buttons:

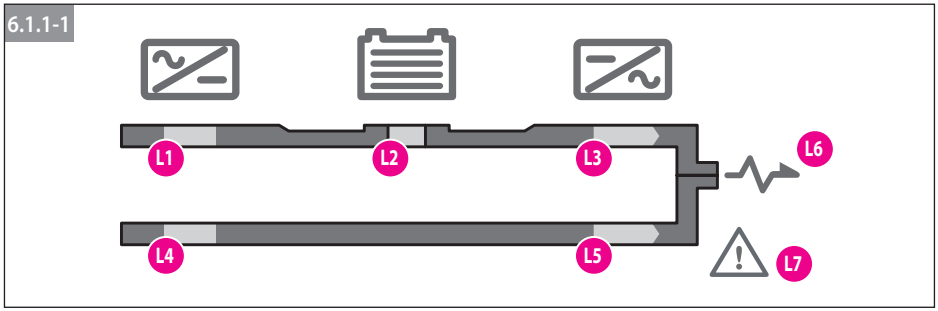
- **ESC**: exit from the current menu/parameter/action;
- **UP** ∧ : scrolls the available menus/values upwards. It increases the value each time it is pressed when changing a parameter;
- **DOWN** ∨ : scrolls the available menus/values downwards. It decreases the value each time it is pressed when changing a parameter;
- **ENTER**: enters the menu displayed on the screen to confirm the choice/changes made.

6.1-1



6.1.1 Meaning of LEDs.

6.1.1-1



LED L1 - GREEN:

- On: Rectifier and Battery charger on
- Flashing: Rectifier alarm
- Off: No input mains present

LED L2 - YELLOW:

- On: Operation from battery - battery test
- Flashing: Battery section alarm
- Off: Battery charged

LED L3 - GREEN:

- On: Inverter on
- Flashing: Inverter failure or fault
- Off: Inverter off or power supply from automatic bypass

LED L4 - GREEN:

- On: Auxiliary input mains present and ok
- Flashing: Auxiliary input mains out of tolerance
- Off: Auxiliary input mains not present

LED L5 - YELLOW:

- On: Output on automatic bypass mode
- Flashing: General bypass alarm
- Off: Power supply from inverter

LED L6 - GREEN:

- On: Output powered
- Flashing: By pass general alarm Inverter failure or fault
- Off: Load not powered

LED L7 - RED:

- On: Activation code alarm - Maintenance
- Flashing: General alarm
- Off: No alarms

ENGLISH

6.1.2 Meaning of the status light bar.

The light bar **B** (figure 6.1-1)provides an immediate indication of the condition of the power supply to the load:

- Red: power supply not present or shutdown imminent.
- Yellow: power supply present but unstable or temporary.
- Green: power supply sure and regular.

Meaning of the status light bar

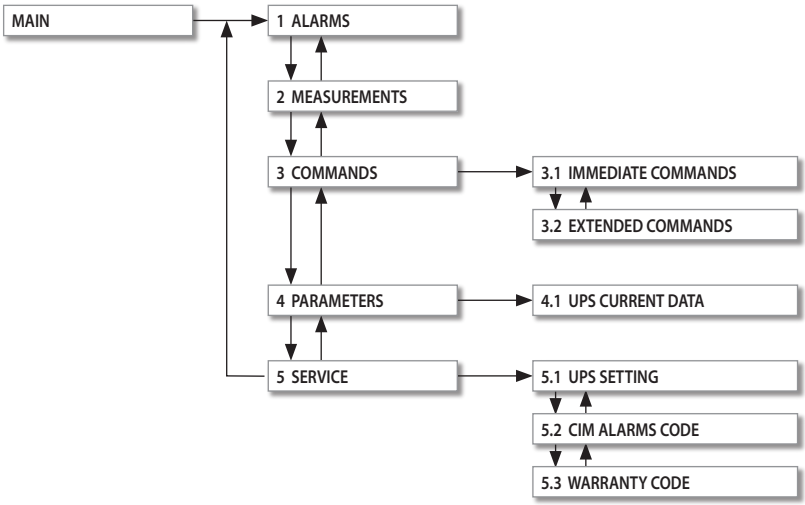
Colour	Condition displayed
RED flashing	Imminent shutdown alarm (the load will be disconnected in a few minutes)
RED	Load not powered or battery circuit open
YELLOW flashing	Alarm indicating request for ordinary maintenance after over 25.000-30.000 hours of operation according to conditions of use (type of load, temperature), (L7 flashing and alarm A44) UPS in stand by
YELLOW	Load on battery or battery discharging if LED 2 is on steady
YELLOW	On automatic bypass if LED 5 is on steady
YELLOW	End of First maintenance period (10.000 hours) UPS in maintenance mode
GREEN flashing	Battery Test in progress
GREEN	Load powered by the inverter or in high efficiency mode

6.1.3 Display menu.

This paragraph describes the menus available on the mimic panel and their functions.

The displays are organised into menus and submenus as shown in the figure:

- to access a menu press the **ENTER** key
- to return to the higher level press **ESC** key
- Use the **UP** ∧ and **DOWN** ∨ keys to scroll the information available at a particular level.



6.1.3.1 "Alarms" menu

This menu displays all the alarms that are active at the time of access. The alarms menu is activated automatically when an alarm condition occurs.

ALARMS menu		
Code	**Mimic panel message**	**Description**
A00	GENERAL ALARM	At least one alarm is present
A01	BATTERY ALARM	Battery circuit failure or faulty operation.
A02	OUT OVERLOAD	Power required in output over the limits.
A06	VAUX OUT OF TOL	The voltage or frequency limits accepted by the bypass have been exceeded.
A07	OVER TEMPERATURE	Temperature excessive or ventilation problems.
A08	MAINTEN. BY-PASS	Active bypass procedure
A17	IMPROPER USE	Improper conditions of use verified (load, mains, temperature).
A18	OVERLOAD OFF INV	Inverter shutdown due to overload.
A20	WRONG CONFIG	Error in the configuration parameters (e.g. different between several UPS units in parallel).
A22	MAINS OUT OF TOL	The voltage or frequency limits accepted by the rectifier have been exceeded
A23	RECTIFIER ALARM	Rectifier fault
A25	INVERTER ALARM	Inverter fault
A26	BATT CHARGER ALM	Battery charger fault
A29	BY-PASS ALARM	Bypass fault
A30	OVERLOAD STOP	The duration of the overload has inhibited the bypass.
A38	EXTERNAL ALARM 1	Signalling from ADC input
A39	EXTERNAL ALARM 2	Signalling from ADC input
A40	EXTERNAL ALARM 3	Signalling from ADC input
A41	EXTERNAL ALARM 4	Signalling from ADC input
A42	E-SERVICE ALARM	Alarm that generates automatic sending of a signal to the support centre (if the service has been activated)
A43	REDUNDANCY LOST	The power required by the load no longer allows the preset redundancy N+x (signalling for UPS units in parallel) to be maintained.
A44	SERVICE CHECK	Notification that the periodic service check is overdue
A49	BATT. DISCHARGED	The energy available in the battery has been used up.
A51	OPTIONAL BOARD ALM	Fault in the optional cards in the slots.
A58	ESD ACTIVATED	The remote emergency shutdown command has been activated.
A59	BATTERY CIRCUIT OPEN	The battery switch is open.
A60	FAN FAILURE	Fans faulty or blocked
A61	PHASE ROT FAILURE	Wrong phase cycle direction

6.1.3.2 "Measurements" menu

This menu is used to display all the measurements relating to the UPS input, output and to the battery. For models with single phase input or output, the voltage and current displays are adjusted automatically.

MEASUREMENTS menu

Type of measurements	Value	Value	Value	Note
OUTPUT VOLTAGE	___ V	___ V	___ V	Output voltage
OUTPUT LOAD	__ %	__ %	__ %	Output load percentage
OUT ACTIVE PWR	__._ kW			Output active power
OUTPUT FREQNCY	__._ Hz			Output frequency
AUX VOLTAGE	___ V	___ V	___ V	Auxiliary mains voltage
AUX FREQUENCY	__._ Hz			Auxiliary mains frequency
INPUT VOLTAGE	___ V	___ V	___ V	Input mains voltage
INPUT FREQUENCY	__._ Hz			Input mains frequency
BATTERY VOLTAGE	B+___ V	B-___ V		Battery voltage
CAPACITY	__ %			Battery capacity percentage during charging
BACKUP TIME	T___MIN			Backup time during battery discharge
ENVIRON. TEMP	__ °C			Internal temperature

6.1.3.3 "Commands" menu

This used to send immediate commands for start-up/shutdown/reset alarms to the UPS and to select the operating mode. Commands can also be sent for diagnostic purposes by means of the extended commands menu (if enabled in the configurations menu). The command is activated by selecting it with the **UP** ∧ e **DOWN** ∨ keys, press **ENTER**, confirm **YES** or **NO**, then press **ENTER**.

IMMEDIATE COMMANDS menu

Command	Description
START PROCEDURE	UPS start-up command
STOP PROCEDURE	UPS shutdown command
HIGH EFF. MODE	High efficiency mode: activates the energy saving feature
NORMAL MODE	Activates normal double conversion operation
ALARM RESET	Resets all the alarms
LED TEST	Performs the test on the mimic panel LEDs

EXTENDED COMMANDS menu

Command	Description
BATTERY TEST	Activates the battery test to check battery efficiency
FORCED ON BY PASS	Activates the switch over to the static bypass. This procedure is necessary when the manual bypass is used.
DISABLE CHECK UP	Disable the message of perio dically maintenance

6.1.3.4 "Parameters" menu

Provides the display of the parameters set for the UPS.

UPS CURRENT DATA menu

Message	Description
MASTERYS 3/3 12KVA SN. 0000000000	Displays the size, input and output phases configuration and the serial number of UPS
UC FW. REVISION RV 000 CKS: 0000	Identifies the software release of microprocessor
DSP FW. REVISION RV 000 CKS: 0000	Identifies the software release of DSP

6.1.3.5 "Service" menu

This is used to change the configuration parameters, insert the warranty activation code and display the service code.

"UPS SETTINGS" menu

This is used to change the configuration parameters. Access is via the password **MAST** which is keyed in by using the **UP** ∧ e **DOWN** ∨ keys and **ENTER** to go on to the next letter.

UPS SETTINGS menu

Parameter	Description	Allowed values
SET OUTPUT VOLTAGE	Sets the required output voltage value	208/220/230/240 V
SET OUTPUT FREQUENCY	Sets the required output frequency value	50/60 Hz
SET MODE CONVERTER	Sets whether the UPS has to operate as a frequency converter ⚠ **WARNING!** Set **only** on UPS with mains power (MAINS) and auxiliary mains (AUX MAINS) separated and with the auxiliary mains (AUX MAINS) **disconnected!** **Do not set** on UPS with common mains lines as it could **damage the load!**	YES/NO
SET MODE AUTORESTART	Sets whether the UPS has to restart automatically after shutdown due to minimum battery	YES/NO
SET BATTERY AVAILABLE	Set if battery are present	YES/NO
if YES:		
- SET BATTERY TYPE	Selects the type of batteries used	Sealed
- SET BATTERY CAPACITY	Sets the battery capacity in Ah	9,5 – 1000 Ah
- SET CHARGER TYPE	Selects the type of recharge required	Auto, Float, int.
- SET BATTERY ELEMENTS	Set the number of battery elements	90 - 108
- SET BATT_TEST PERIOD	Sets how often to perform the battery test (zero do not perform the test) in days	0, 30, 60, 90, 120,150.180
SET BACKFEED TYPE	Sets the type of backfeed protection	Disable , 1.BYPASS , 2.ByPass-Input alone, 3.ByPass-Input common
SERIAL LINK	Inserts the serial communication parameters:	
	Serial Link Baud Rate	1200/2400/4800/9600/14.4
	Serial Link Parity	odd/even/none
	Serial Link Bit Number	8-9
	Serial Link Stop Bits	0-1
	When the data is confirmed, the serial connection automatically changes the configuration without having to switch off the UPS.	
JBUS SETTING SLAVE NR.	Sets the mimic panel jbus node	1/32
	When the data is confirmed, the serial connection automatically changes the configuration without having to switch off the UPS.	
DATE SETUP	Sets the date	GG/MM/AA
TIME SETUP	Sets the time	HH:MM
SYN EXT CMDS ENABLED	Enables/Disables the mimic panel extended commands	YES/NO
REMOTE CMDS ENABLED	Enables the transmission of commands from external systems	YES/NO
SET BUZZER	Enables/Disables the buzzer	YES/NO

"CIM Alarms Code" menu.

This displays the service code to be sent to the support service to make an accurate and rapid diagnostic of the possible failure.

In the event of a fault, select the menu **SERVICE** > **CIM ALARMS CODE** and inform the support centre of the code displayed..

ALARMS CODE 1/2	
1) 0000	2) 0000

ALARMS CODE 2/2	
3) 0000	4) 0000

This chapter defines the operating procedures to be followed to activate and manage the UPS.

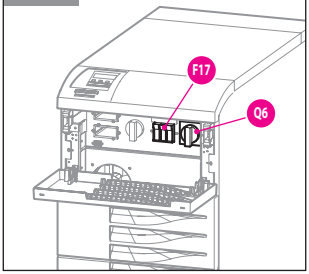
For UPS units in parallel.
Carry out the procedures on all UPS units before going on to the next operation.
Each procedure should be carried out on all UPS units within 30 seconds.

7.1 OPERATING PROCEDURES.

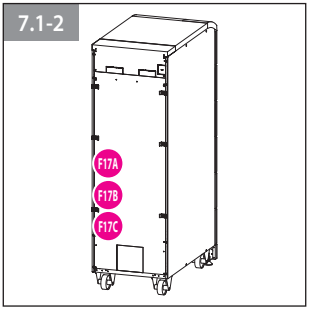
7.1.1 Start-up in normal mode.

- Close the disconnecting switches **F17A**, **F17B**, **F17C** if present.
- Close the battery disconnecting switch **F17** in the commands recess
- Apply voltage to the UPS.
- Wait for the mimic panel to start up.
- Activate the **START PROCEDURE** from the **COMMANDS** menu on the mimic panel.
- Set disconnecting switch **Q6** to position 1 (output disconnecting switch closed).
- The load is now powered and protected by the UPS.

7.1-1



7.1-2



7.1.2 Shutdown.

Shutdown interrupts the power supply to the load and stops the UPS and the battery charger.

- Activate the **STOP PROCEDURE** from the **COMMANDS** menu on the mimic panel, wait approx. 2 minutes for shutdown (the controlled shutdown of any servers is managed via the shutdown software). **Immediate shutdown is achieved by pressing the ENT key for more than three seconds**.
- Set disconnecting switch **Q6** to position 0 (output switch open).
- Open the battery disconnecting switch **F17** (battery circuit open).
- Disconnect main and auxiliary voltage to the UPS.

7.1.3 Extended out of service.

In the event of an extended period of UPS inactivity, the batteries must be recharged every three months.

- Close the disconnecting switches **F17A**, **F17B**, **F17C** if present.
- Close the battery disconnecting switch **F17** in the command recess
- Apply main and auxiliary voltage to the UPS.
- Set or keep disconnecting switch **Q6** to position 0 (output inverter OFF).
- The battery must be charged for at least ten hours.
- After ten hours:
- Open the battery disconnecting switch **F17** (battery circuit open).
- Open the disconnecting switches **F17A**, **F17B**, **F17C** if present.
- Disconnect main and auxiliary voltage to the UPS.

7.1.4 Switching onto external manual bypass (optional).

Switching onto the manual bypass creates a direct connection between the UPS input and output, completely excluding the equipment control part.

This operation is performed in the event of ordinary maintenance on the equipment, so as not to remove the power supply from the load, or in the event of a serious failure while waiting for the equipment to be repaired.

- From the mimic panel set the **FORCE ON Bypass** from the **EXTENDED COMMANDS** menu.
- Wait for the command to be executed (on the mimic panel: **LED L5** on).
- Close the external manual bypass switch
- Open the input and output disconnecting switches on the manual bypass panel
- Open the battery disconnecting switch **F17** (battery circuit open).

7.1.5 Return to normal mode from external manual bypass activated.

- Close the UPS input disconnecting switch on the manual bypass panel
- Close the battery disconnecting switch **F17** (battery circuit closed).
- Check that alarm **A06** is not active (if it is, then solve the problem before continuing).
- From the mimic panel set the **FORCE ON Bypass** from the **EXTENDED COMMANDS** menu.
- Activate the **START PROCEDURE** from the **COMMANDS** menu on the mimic panel.
- Wait for the command to be executed (on the mimic panel: **LED L5** on).
- Close the output disconnecting switch on the manual bypass panel
- Open the external manual bypass switch.
- From the mimic panel set the **NORMAL MODE** from the **COMMANDS** menu.

7.1.6 Switching onto internal manual bypass (optional)

This operation is performed in the event of ordinary maintenance on the equipment, so as not to remove the power supply from the load, or in the event of a serious failure while waiting for the equipment to be repaired.

- Check that there are no alarms active.
- From the mimic panel set the **FORCE ON Bypass** from the **EXTENDED COMMANDS** menu.
- Wait for the command to be executed (on the mimic panel: **LED L5** on).
- Move the **Q6** switch from position 1 to position 2, manual bypass
- Stop the UPS with **STOP PROCEDURE** from the **COMMANDS** menu (do not move the switch **Q6**)
- Open the input mains disconnecting switch (not the auxiliary mains).
- Set disconnecting switch **Q2** to position 0
- Open the battery disconnecting switch **F17** (battery circuit open).

7.1.7 Return to normal mode from internal manual bypass activated.

- Close the input mains disconnecting switch
- Set disconnecting switch **Q2** to position 1
- Close the battery disconnecting switch **F17** (battery circuit closed).
- From the mimic panel set the **FORCE TO Bypass** from the **EXTENDED COMMANDS** menu (on the mimic panel: **LED L5** on).
- Activate the **START PROCEDURE** on the mimic panel. Do not move **Q6** switch
- Move the **Q6** switch from position 2 to position 1, UPS output.
- From the mimic panel set the **NORMAL MODE** from the **COMMANDS** menu.

7.1.8 Emergency shutdown (E.S.D.).

Should it be necessary to interrupt the continuous power supply provided by the UPS quickly (emergency shutdown), this can be done by putting disconnecting switch **Q6** to position 0 (zero) or, where applicable, by activating the emergency button/switch connected to the ADC card.

The UPS output can only be electrically disconnected by means of Q6.
If the UPS is operating from the manual bypass with mains present, shutdown by means of the emergency button does not interrupt the power supply to the load. In emergency conditions all the power supply sources upstream of the UPS must be disconnected. The batteries must also be disconnected by opening switch F17.

ENGLISH

8.1 MULTI-LEVEL COMMUNICATION.

MASTERYS™ is able to manage a variety of serial, contact and Ethernet communication channels simultaneously.

The various cards and signalling accessories are inserted in the two standard communication slots. This gives MASTERYS™ immediate interfacing and integration flexibility as soon as the unit is installed with no need for trained personnel.

The table below lists the possible connections between the communication channels and external devices.

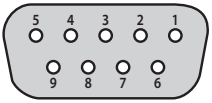
3 communication levels

	Slot 1	Slot 2	RS 232/485
ADC card	●	●	
NetVision[2] card	●	●	
UniVision pro			●
Remote Panel			●
BMS[1]			●

[1] Building Management System.

[2] Ethernet adapter with Web/SNMP 10/100Mb functions (required for E-service via Web)

8.1-1



Legend pin RS232/485 C1

1 Not connected
2 RX for RS232
3 TX for RS232
4 Data +
5 GND for RS232
6 Data –
7 Reserved
8 Not connected
9 +12 V

As each channel is independent, simultaneous connections can be made to satisfy the different levels of signalling and remote monitoring.

See the options paragraph to access the detailed functions of the cards installed in the slots..

Please note that two Net Vision cards cannot be connected simultaneously.

8.2 ACCESSORIES AND SW OPTIONS.

A large number of SW solutions can be adopted on MASTERYS™ thanks to its advanced communication facilities. These solutions have been specially designed for the efficient management of power protection devices.

UNI VISION PRO is the solution for managing a UPS connected to the local server via RS232 interface or via LAN network. It is normally used at departmental level to automatically shutdown the systems and ensure secure control of the UPS that in turn protect servers and workstations.
The main functions are:

- Graphic monitoring of the UPS via web browser
- Local shutdown of a server connected via serial interface
- Remote shutdown via proxy agent and optional Java shutdown clients
- Notification of anomalies via e-mail to a maximum of 8 addresse.

NET VISION is a solution for managing UPS units connected directly to the local network. It is normally used on medium/large, complex networks and in multi-server environments where the IT manager centrally controls all the network resources. The physical position of the UPS is not significant.
The main functions are:

- 10/100Mb Ethernet connection (RJ45)
- Graphic monitoring of the UPS via web browser
- Remote shutdown of up to 40 computers
- Notification of anomalies via e-mail to a maximum of 8 addresses
- UPS management using SNMP protocol
- Diagnostics via Internet offered by e-Service.

Java & .NET shutdown Client (JNC) is an optional Java application to be installed on a server for the automatic shutdown of the computers on the network before the UPS stops due critical operating conditions (imminent battery failure, overload, etc.). It is supplied as an option and can be associated to the UNI VISION PRO or NET VISION communication solutions.
The main features/functions are:

- Use of the TCP/IP standard network protocol
- Graphics interface for easy configuration
- Minimum use of CPU resources
- Personalisation of shutdown parameters and script
- Continuous monitoring of the efficiency of the connection to the UPS.

T.SERVICE

T.SERVICE This is a cutting edge supervision service ensuring 24 x 7 service. It ensures effective prevention and constant monitoring of the system.

Communication between the UPS and the local technical support centre is via Internet with the help of NetVision (via the mail-server on the same network).

Any emergency situation is managed and resolved extremely quickly and remotely by the Support Centre, with immediate intervention on site if needed.

The auto-diagnostic system analyses UPS operating conditions, identifies faults and monitors environmental conditions such as temperature, overload, etc, avoiding the risk of equipment stoppages. In the event of a failure, the system immediately sends a diagnostic report via e-mail or modem to the support centre.

The alarm messages displayed enable an immediate diagnosis.
Alarms are divided into two categories:
- alarms related to the UPS external circuits, (input mains, output mains, temperature and environment).
- alarms related to the UPS internal circuits. In this case, the corrective actions will be carried out by the After Sales Department.

9.1 SYSTEM ALARMS.

- **A02: output overload**.
  The power required by the loads is higher than the power available.
  Check that the load is well balanced on the three phases by checking the measurements on the display. If needed, disconnect any loads that do not need uninterruptible power.

  Important!
  The accepted overload time limit is defined in the technical specifications. When this time limit is exceeded, the loads will no longer be powered by the inverter.

- **A06: auxiliary mains out of tolerance**.
  The auxiliary mains supply exceeds the acceptable tolerance values. Possible causes are:
  - No voltage or frequency present or voltage and frequency out of acceptable values (see the technical specifications).
  - The frequency is subject to continuous variations (typical with power supplied from an incorrectly sized GE).

- **A07: temperature over the limits.**
  The technical plant temperature is higher than the maximum value recommended.
  Check the ventilation or air conditioning system in the UPS room.

- **A17: improper conditions of use.**
  This alarm does not indicate a malfunction or failure of the UPS, but an incorrect use/sizing of the system. It is activated in the event of:
  - Operation for long periods at high temperatures (battery deterioration)
  - High number of overloads (wrong sizing)
  - Continuous battery discharging (mains not stable)
  - High number of switches onto the bypass (high impulsive loads).

- **A22: input mains out of tolerance.**
  The input mains is not present or not sufficient (voltage and/or frequency values incorrect with reference to the technical data); if there is no input mains outage, check if no protections upstream of the UPS have tripped.
  Check that the voltage applied and frequency values are in compliance with the values set on the mimic panel.

- **A38, A39, A40, A41: external alarm 1, 2, 3, 4.**
  One of the ADC card inputs has been activated; check the situation of the devices connected to this card.
- **A56, A57: generator general alarm.**
  The generator has sent an alarm; check directly on the GE.
- **A61: wrong phase cycle direction.**
  The phase cycle sequence is incorrect. In this case, invert two phases of the input mains. For a UPS with separate auxiliary mains, exchange the two phases of the auxiliary mains only.

9.2 UPS alarms.

- **A01: battery alarm.**
  Failure or problem on the battery circuit. Check that the battery switch is closed.
- **A18: inverter blocked due to overload.**
  Reduce the load rate applied to the UPS and reset the alarms.
- **A20: wrong configuration.**
  Error in the configuration parameters; contact the support service.
- **A30: block due to overload.**
  Reduce the load rate applied to the UPS and reset the alarms.
- **A42: T.Service general alarm.**
  MASTERYS™ products can be remotely serviced. This alarm indicates that a procedure for analysing the UPS failure has been activated by the support centre (if an e-service contract has been concluded).
- **A44: programmed control.**
  The equipment has to undergo periodic checks by the support service in order to ensure optimum performance and efficiency. If the "Programmed Control" signal appears on the mimic panel, the equipment should be inspected by a technician trained accordingly.

9.3 PREVENTIVE MAINTENANCE.

We would like to inform you that specialised periodic maintenance (with yearly frequency) is recommended for the MASTERYS™, in order to offer optimum operating efficiency and avoid downtime of the equipment.
It is strongly recommended to give due consideration to any requests for preventive maintenance automatically displayed with alarm message A44 (refer to paragraph 6.1.3.1).
All operations on the equipment must be only carried out by SOCOMEC UPS personnel or by authorised support personnel.
Maintenance consists of accurate functional checks on electronic and mechanical parts with replacement of parts subject to wear if necessary (typically batteries, fans and capacitors).

9.3.1 Batteries.

The state of the battery is fundamental to UPS operation.

Thanks to the **Expert Battery System**, the information relating to the state and the conditions of use of the battery are processed in real time and the recharging and discharging procedures are selected automatically in order to optimise battery life expectancy and offer maximum performance.

Furthermore, during the operating life of the battery, MASTERYS™ stores statistics on the conditions of use of the battery for analysis.

Since the expected life of the batteries is very much dependent on operating conditions (number of charging and discharging cycles, load rate, temperature), a periodic check by authorised personnel is recommended.

When replacing the batteries, use the same type and configuration by placing them in the appropriate containers so as to avoid the risk of acid leakage.
The replaced batteries must be disposed of at authorised recycling and disposal centres.
Do not open the plastic cover of the batteries as they contain harmful substances.

9.3.2 Fans.

The life of the fans used to cool the power parts is dependent on the using and environmental conditions (temperature, dust).

Preventive replacement by an authorised technician is recommended within four years (in normal operating conditions).

When needed, fans should be replaced as per specifications by SOCOMEC UPS.

9.3.3 Capacitors.

The equipment houses electrolytic capacitors (used in the rectifier and inverter section) and filtering capacitors (used in the output section), whose life is dependent on using and environmental conditions.

The average expected life of these components is shown below:

- Electrolytic capacitors: 5 years;
- Filtering capacitors: 7 years.

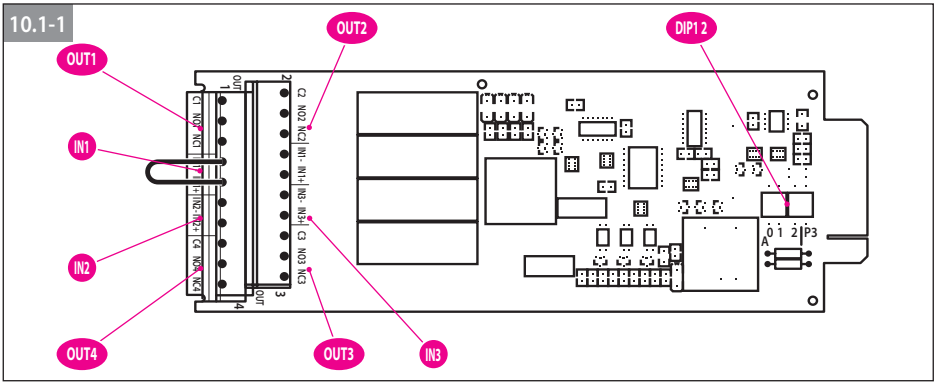
In any case the effective state of the components is verified during preventive maintenance.

ENGLISH

10.1 ADC CARD.

This card can be configured to control up to four outputs that are normally closed or normally open and up to three digital inputs. A maximum of two cards can be installed on each unit. The card must be inserted in slot S1 or S2 (see paragraph 5.1).

10.1-1



Up to four operating modes can be selected using the two DIP switches 1 or 2.

- The filter level indicates:

  1 immediate activation (1 second minimum communication time) - **2** 10 s delay - **3** 30 s delay.

Mode 1 - STANDARD configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
OFF	OFF	Out 1	General Alarm	2
OFF	OFF	Out 2	Battery discharging	3
OFF	OFF	Out 3	Battery low or imminent stop	2
OFF	OFF	Out 4	UPS on by-pass	2
OFF	OFF	In 1*	E.S.D.	1
OFF	OFF	In 2	Supply from GenSet	1
OFF	OFF	In 3	Isolation controller	2

Mode 2 - POWER SAFE configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
ON	OFF	Out 1	General Alarm	2
ON	OFF	Out 2	Power safe plug 1	2
ON	OFF	Out 3	Power safe plug 2	2
ON	OFF	Out 4	Power safe plug 3	2
ON	OFF	In 1*	E.S.D.	1
ON	OFF	In 2	Supply from GenSet	1
ON	OFF	In 3	Management of energy consuption	1

Mode 3 - SAFETY configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
OFF	ON	Out 1	General Alarm	2
OFF	ON	Out 2	E.S.D. activation	1
OFF	ON	Out 3	Battery low or imminent stop	2
OFF	ON	Out 4	E.S.D. activation	1
OFF	ON	In 1*	E.S.D.	1
OFF	ON	In 2	External alarm A39	2
OFF	ON	In 3	External alarm A40	2

Mode 4 - ENVIRONMENTAL configuration

Position dip1	Position dip2	IN/OUT	Description	Filter level
ON	ON	Out 1	General Alarm	2
ON	ON	Out 2	Over-heating	2
ON	ON	Out 3	Overload / Loss of redundancy	2
ON	ON	Out 4	External alarm In2	2
ON	ON	In 1*	E.S.D.	1
ON	ON	In 2	External alarm A39	2
ON	ON	In 3	External alarm A40	2

* if the external E.S.D. button is not used, always insert a jumper to short circuit input IN 1 (Figure 10.1-1).

Description of signals	
Message on the mimic panel	**Description**
General Alarm	General alarm contact output: • No Alarm: - NO contact: closed - NC contact: open • Alarm: - NO contact: open - NC contact: closed
Battery discharging	Battery discharging contact output
Battery Low or Imminent stop	Battery low voltage and imminent shutdown contact output
UPS on bypass	UPS on bypass contact output
E.S.D.	Contact input for emergency shutdown device
Supply from GenSet.	Generator ready signal input
Isolation controller	Isolation leakage controller signal input
Power safe plug 1	Non privileged load 1 command output activated by overload or loss of redundancy
Power safe plug 2	Non privileged load 1 command output activated by battery discharging
Power safe plug 3	Non privileged load 1 command output activated by battery low
Management of energy consumption	Input for the battery to help providing energy in the event of peak consumption
E.S.D. activation	Shutdown for E.S.D. contact output
Over-heating	Internal over-heating contact output
Overload/Loss of redundancy	Overload / loss of redundancy contact output

10.1.1 ADC card installation.

- Set the operating mode by means of the **DIP switches 1 and 2**
- If the external ESD contact is not used, check that there is a jumper between pins **IN1+** and **IN1-**. If there is no jumper, the UPS cannot be started when the card is inserted in the slot.
- Connect the signal cables to the card terminals
- Insert the card in a free slot
- Secure the card with the appropriate screws.

10.1.2 Electrical data.

- Admitted Nominal current and voltage of NO or NC contacts: 2 A 250 Vac depending on the terminal used.
- Inputs are activated on loop closing.

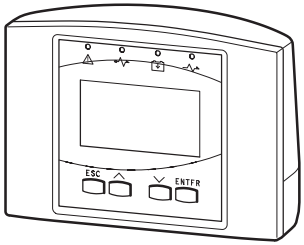
10.2 ISOLATION CONTROLLER.

This device continually checks the transformer isolation, displaying an alarm message on the mimic panel.

10.3 REMOTE MIMIC PANEL.

This device monitors and interacts with the UPS through a serial link RS 485 (maximum distance of 175 m) 25 m cable supplied standard; 50 m cable available as an option). Connect the RS485 cable supplied onto port C1 of the unit (see figure 5.1-1). Refer to the relevant user manual for instructions on how to use the device.

10.3-1



10.4 INTERNAL MANUAL BYPASS.

This option is used to switch to manual bypass and completely shut down the UPS without the need to add any external control panels (a separate back-up power supply is required or a distribution arrangement with separate disconnecting switches for the mains input power and back up power supplies.

10.5 EXTERNAL MANUAL BYPASS.

This device will electrically exclude and isolate the UPS (e.g. for maintenance operations) without interrupting the power supplied to the load.

10.6 POWER SHARE.

10.6.1 General information.

The POWER SHARE function can be used to programme the supply of energy to the loads connected to the POWER SHARE terminal board via the mimic panel or the NET-VISION option (Network Integrator).
The loads powered from this plug may have a lower priority than the privileged applications connected to the main plug and may be excluded in critical situations.

10.6.2 Operating modes.

WARNING!
Changing the configuration from "Standard" to "Emergency lights" must be carried out only by specially trained SOCOMEC UPS staff.

- **Standard.**
  In standard configuration, the load connected to the POWER SHARE plug is disconnected if one of the following conditions is verified:

- Mains failure >10 seconds and load rate > 85%.
- Mains failure >30 seconds and "battery low" condition
- In the presence of mains with overload > 15 seconds

- **"Emergency lighting".**
  In an emergency lighting configuration, the load connected to the POWER SHARE plug operates with inverse logic, i.e. it is connected if the following condition is verified: Mains power is not present.

According to the EN 50171 standard, the time taken to activate the power share plug is within 0.5 seconds.

On return of the nominal mains parameters, the plug operating conditions are restored.

If the UPS is out of service, the power share plug nevertheless powers the load connected to it by operating in permanent configuration.

THE LOAD CONNECTED TO THE POWER SHARE PLUG IS ALWAYS POWERED, REGARDLESS OF THE CONFIGURATION SELECTED.

Maximum current that can be drawn from the power share terminals: 16 A 250 Vac Ac3 3-phase.

10.7 SEPARATE AUXILIARY POWER SUPPLY.

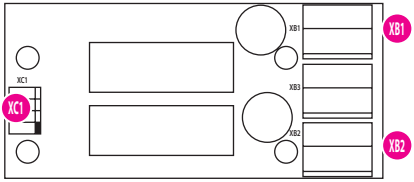
This allows the use of an auxiliary energy source other than the primary mains power supply in the event of outage.

10.8 EXTERNAL BACK-FEED PROTECTION.

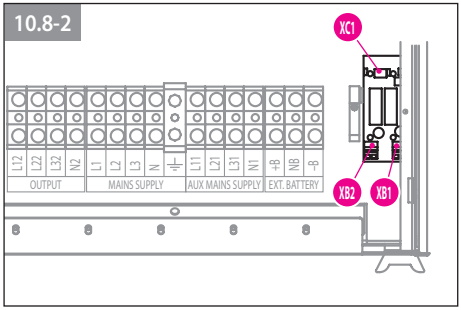
The UPS systems are designed for the installation of an external device that protects against the back-feed of dangerous voltages on the power line, or if it is a separate line, on the auxiliary back up power supply line. The BKF card shown in figure 10.8.1 is used to control the external device. The BKF PCB is installed in the position shown in fig 10.8.2.

Refer to the following paragraphs for details on the electrical connections and on activating the chosen protection.

10.8-1



10.8-2



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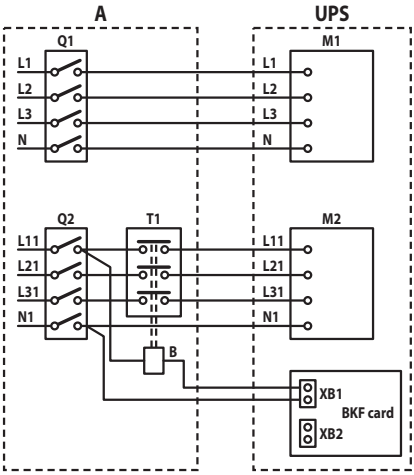
10.8.1 Protection on the separate auxiliary mains.

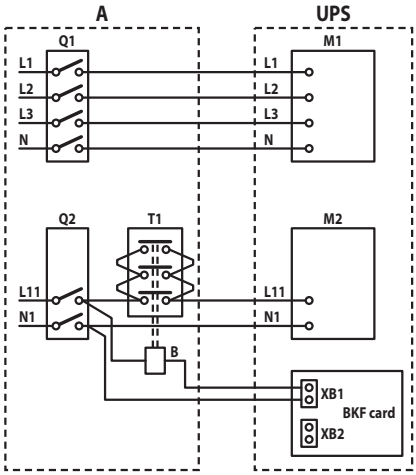
Activating UPS protection on the mimic panel: access the **Configurations menu** on the mimic panel (see the **Configurations Menu** under the **Service Menu** section of the manual) and set the **BACKFEED TYPE** parameter to **1.BYPASS**.

Diagram of Principle.

10.8.1-1 Three phase UPS with separate auxiliary mains.



10.8.1-2 UPS with single phase separate auxiliary mains.



Legend.

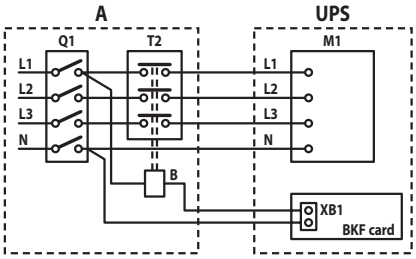
A	Distribution panel
B	Coil remote switch
L1-L2-L3-N	Input power source
L11-L21-L31-N1	Backup power source
M1	Input power terminal board
M2	Backup power terminal board
Q1	magneto-thermal input mains switch
Q2	magneto-thermal aux mains switch
T1	32A AC1 remote contactor 3-pole, 230V coil
T2	90A AC1 remote contactor 3-pole, 230V coil
XB1	Connector on BKF PCB
XB2	Connector on BKF PCB

10.8.2 Protection on a UPS without auxiliary mains supply.

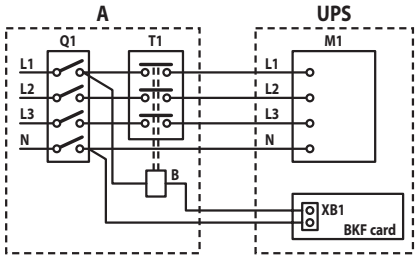
Activating UPS protection on the mimic panel: access the **Configurations menu** on the mimic panel (see the **Configurations Menu** under the **Service Menu** section of the manual) and set the **BACKFEED TYPE** parameter to **3.BYPASS-INPUT Common**.

Diagram of Principle.

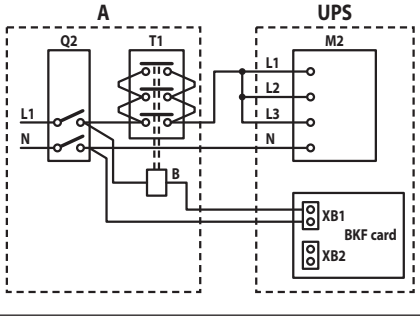
10.8.2-1 Single fase output UPS without separate auxiliary power supply .



10.8.2-2 Three phase UPS without separate auxiliary power supply.



10.8.2-3 Single phase UPS without separate auxiliary power supply (only for 8 kVA and 10 kVA).



Legend.

A	Distribution panel
B	Coil remote switch
L1-L2-L3-N	Input power source
M1	Input power terminal board
Q1	magneto-thermal input mains switch
T1	32A AC1 remote contactor 3-pole, 230V coil
T2	90A AC1 remote contactor 3-pole, 230V coil
XB1	Connector on BKF PCB

Note.

The neutral is not disconnected as, even in the event of a single fault on the UPS, it never has high potential when the mains and/or auxiliary power supplies are disconnected upstream. This is to prevent transformation of the power source to the UPS every time there is a power failure.

Should the Neutral potential be very high due to certain error conditions or due to installations downstream (e.g. ground fault not detected and protected, high dispersion of a phase, or the IT system), it will be necessary to install either devices that disconnect the Neutral or alternatively a system that detects, signals and protects against high neutral/ground potential that could lead to UPS failure.

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Models

	8	10	10	12	12
Input/Output phases	1/1 or 3/1 (autosetting)	1/1 or 3/1 (autosetting)	3/3	3/1	3/3

Standards

	8	10	10	12	12
Safety	(EN) IEC 62040-1-1, (EN) IEC 60950-1-1*				
Type and performance	(EN) IEC 62040-3 (VFI-SS-111)				
EMC	IEC 62040-2, EN 50091-2				
Product certification	CE				
Protection level	IP20 (compliant with IEC 60529), IP21 on request				

*TÜV tested

Environment

	8	10	10	12	12
Operating temperature	0÷40 °C (15÷25 °C recommended for longer battery life)				
Storage temperature	-5÷50 °C (15÷25 °C recommended for longer battery life)				
Relative humidity	0÷95% condensation-free				
Max. altitude	1.000 m (3.300 ft) without derating; 3.000 m (10.000 ft) max				
Acoustic noise (dB)	< 52				
Required cooling capacity (m^3/h)	≤ 400				
Dissipated power max (W)	622	778	778	933	933
Dissipated power (BTU/h)	2.120	2.650	2.650	3.180	3.180

Electrical specifications - Input

	8	10	10	12	12
Mains voltage	400 V ±20% (up to -35% @70% of nominal load) (three phase + neutral) 230 V ±20% (up to -35% @70% of nominal load)				
Input frequency	50/60 Hz ±10%				
Input power factor	> 0,99 (single phase) > 0,95 (three phase)				
THDI	< 6% (single phase) < 25% (three phase)				

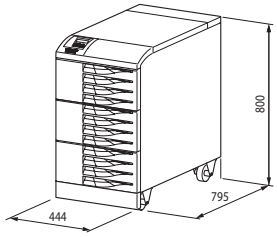
Electrical specifications - Output

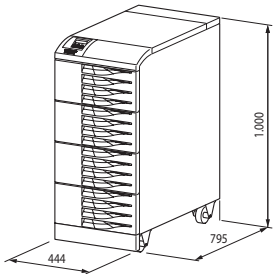
	8	10	10	12	12
Output voltage	230 V single phase (208 (Pout 90%)-220-230-240 V selectable) ±1% 400 V three phase (380-415 V selectable) ±1%				
Frequency	50/60 Hz ±2% (from 1% to 8% if generator is used)				
Automatic bypass	nominal output voltage ±15% (from 10% to 20% selectable if generator is used)				
Nominal power (kW)	5,6	7	7	8,4	8,4
Overload on mains power supply	125% 2 minutes; 150% 10 seconds				
Crest factor	3:1				
Voltage distortion	1% with linear load				

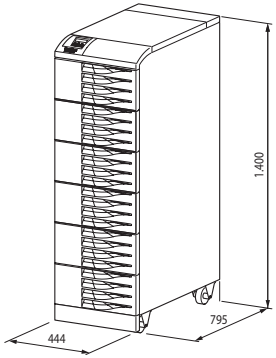
Mechanical characteristics with standard batteries

Model	Input/Output	kVA	Dimensions (LxPxH mm)	Weight (kg)
MAS2BC108S+A1	1/1 o 3/1	8	444x795x800	155
MAS2BC108S+C1	1/1 o 3/1	8	444x795x800	175
MAS2BC108M+A2	1/1 o 3/1	8	444x795x1000	265
MAS2BC108M+C2	1/1 o 3/1	8	444x795x1000	300
MAS2BC108T+B3	1/1 o 3/1	8	444x795x1400	430
MAS2BC110S+A1	1/1 o 3/1	10	444x795x800	160
MAS2BC110S+C1	1/1 o 3/1	10	444x795x800	180
MAS2BC110M+A2	1/1 o 3/1	10	444x795x1000	270
MAS2BC110M+C2	1/1 o 3/1	10	444x795x1000	305
MAS2BC110T+B3	1/1 o 3/1	10	444x795x1400	435
MAS2BC112S+B1	3/1	12	444x795x800	175
MAS2BC112S+C1	3/1	12	444x795x800	185
MAS2BC112M+B2	3/1	12	444x795x1000	275
MAS2BC112M+C2	3/1	12	444x795x1000	310
MAS2BC112T+B3	3/1	12	444x795x1400	440
MAS2BC310S+A1	3/3	10	444x795x800	160
MAS2BC310S+C1	3/3	10	444x795x800	180
MAS2BC310M+A2	3/3	10	444x795x1000	270
MAS2BC310M+C2	3/3	10	444x795x1000	305
MAS2BC310T+B3	3/3	10	444x795x1400	435
MAS2BC312S+B1	3/3	12	444x795x800	175
MAS2BC312S+C1	3/3	12	444x795x800	185
MAS2BC312M+B2	3/3	12	444x795x1000	275
MAS2BC312M+C2	3/3	12	444x795x1000	310
MAS2BC312T+B3	3/3	12	444x795x1400	440

Dimensions







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